Automation

TSX Quantum DeviceNet Scanner Module (RSNetWorx™ Version)

Instruction & Operation Manual

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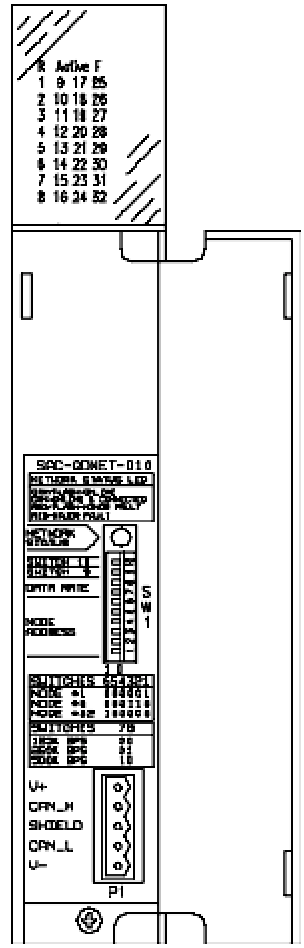
— continued

DeviceNet Scanner for Modicon TSX Quantum PLCs

Lets you connect your DeviceNet devices to a Modicon TSX Quantum PLC



- **A single-slot module that resides in a Modicon TSX Quantum PLC rack; can be local, remote or DIO rack.***
- **Lets you connect up to 63 slave devices.**
- **Communicates directly with the PLC's backplane using 8 or 32 input and output registers.**
- **DeviceNet time can be saved by not transferring I/O values unless a change-of-state (COS) has occurred.**
- **DeviceNet transfer of I/O data can be scheduled (cyclic data).**
- **R4 Register Support (32 Register Mode) and 28 (8 Register Mode).**

* *Because DIO rack supports a maximum of 30 input registers, the scanner module in a DIO rack can be used only with 8 word configuration.*

1. Introduction

The **Quantum PLC DeviceNet Scanner** acts as an interface between DeviceNet devices such as photoelectric sensors, proximity switches, valve manifolds, motor starters, process sensors, bar code readers, variable frequency drives, panel displays, and operator interfaces, and a **Modicon TSX Quantum PLC Processor**. It provides connection to a single DeviceNet network and communicates with DeviceNet devices over the network to:

- **Read inputs from a device**
- **Write outputs to a device**
- **Download configuration data**
- **Monitor a device's operational status**
- **Update the scanner's exec**

Information exchanged includes: Device I/O Data, Status Information, and Configuration Data.

1.1 DeviceNet Basics

DeviceNet is an open network standard, This means that users may specify, install, and use various products from a wide number of suppliers without the need to purchase special equipment, software, or licensing rights. Thus, the user can create a system from a variety of vendors, yet specific to the exact application, mainly using off-the-shelf parts.

DeviceNet is a low-cost communication link that connects industrial devices, such as limit switches, photoelectric sensors, proximity sensors, valve manifolds, motor starters, process sensors, bar code readers, variable frequency drives, panel displays, and operator interfaces to a common network.

Networking devices eliminates the necessity for expensive hard wiring, and the attendant testing and maintenance that goes with it. It also reduces the cost and time needed to wire and install automation devices, while providing improved communication between devices, as well as important device-level diagnostics not easily accessible or available through hard-wired I/O interfaces.

1.2 DeviceNet Functionality

The DeviceNet bus topology is described as “Linear” (trunkline/dropline); power and signal reside on the same network. Nodes may be removed or inserted from the network without powering down the network.

> ***IMPORTANT NOTE: The scanner will not reestablish an active connection with a slave if the scanner and the slave are the only two nodes on the network and the slave is disconnected/reconnected.***
>
> ***To reestablish active connections with this minimum 2 node network, disconnect then reconnect the scanner’s DeviceNet connector.***

1.2.1 Bus Addressing

Bus Addressing can be one of the following:

Peer-to-Peer with Multi-Cast (One-to-Many) — Peer-to-peer are generally token-pass networks. Each device can send messages only when they have the token. The token gets passed based on node number (round robin) or possibly via user-defined priority list. There is no sense of mastership or priority and it is not deterministic. Multi-Cast allows one-to-many and many-to-one relationships to be built dynamically.

Multi-Master with Multi-Cast — Multi-Master addressing is where more than one unit acts as a master.

Master/Slave Special Case — Polled or change-of-state (exception-based). Rather than a Master going through a polling list (scanning), devices report data (input or output) on a COS (change-of-state) basis as the events occur. This mode is considered more efficient for discrete applications. Network traffic is reduced significantly.

1.2.2 I/O Data Exchange

Support for Strobe, Poll, Cyclic, and Change-of State (COS) data exchange methods. Quantum DeviceNet Scanner supports the following operations:

Strobed — Multi-cast message starts off the scan cycle. Strobable slaves respond, based on their latency.

Polled — Master interrogates each node according to the "polling list." Polls are sent out even as strobe responses are being received, as bandwidth allows.

Cyclic — Devices report data on a user-configured time increment basis (input or output). Cyclic data production is considered more efficient for applications with slowly changing analog I/O.

Change-of-State (COS) — Device reports its data only when there is a change. This is considered more efficient since only data changes are transmitted. It can be used along with Poll or Strobe.

A DeviceNet product may behave as a Client, Server, or both. Up to 64 Node Addresses, called Media Access Control Identifiers or "MAC IDs," can be connected to a single DeviceNet network and the end-to-end network distances that can be accommodated are dependent upon the speed of the network. A DeviceNet running at a Baud Rate of 125 kbps can extend up to 500 meters (1,640 feet) while a DeviceNet, running at a Baud Rate of 500 kbps, can only extend to 100 meters (328 feet).

1.3 Configuration

The required configuration tool, such as RSNetWorx™ from Allen-Bradley is used to configure the module. The tool will program the following parameters.

Background Poll Ratio (Background Scan Rate): The Background Poll Ratio sets the frequency of poll messages to a device in relation to the number of I/O scans. For example: if the ratio is set at 10, that device will be polled every 10 seconds.

Interscan Delay: Interscan Delay is the time between scans. It is the time the scanner will wait for non-slave device communication before scanning again.

IMPORTANT NOTE: Until the Background Poll Ratio and the Interscan Delay are saved to SDN, the module Ready LED will flash green.

Scan List Attributes are also programmed by the configuration tool. They are as follows:

- **List of devices to scan**
- **Input size**
- **Output size**
- **Data Exchange type**
- **Type of poll (foreground or background)**

2. Specifications

2.1 DeviceNet Parameters:

Strobe, Poll, COS (Change-of-State), or Cyclic I/O Data for each Node
Interscan Delay
Scan List
Background Poll Rate

2.2 PLC Processor-to-Scanner Communication:

DIP Switch Selectable:

8 I/O Configuration .... uses 8 Input and 8 Output registers
32 I/O Configuration .... uses 32 Input and 32 Output registers

DeviceNet Data:

8 I/O Configuration .... up to 28 words of input and output from the network
32 I/O Configuration .... up to 124 words of input and output from the network

2.3 Power Consumption:

DeviceNet Current Load .... 90 mA (max.)
Backplane Current Load .... 400 mA @ 5 VDC (max.)

2.4 DeviceNet Power .... 24 VDC, Nominal

2.5 Communication Rates .... 125 kbps, 250 kbps, 500 kbps

2.6 Messaging Capabilities .... (Master) Poll, Strobe, COS, or Cyclic

2.7 Isolation .... Optical isolation between Backplane and Network

2.8 Module Location .... Any I/O slot in Quantum PLC rack, local, remote, or DIO

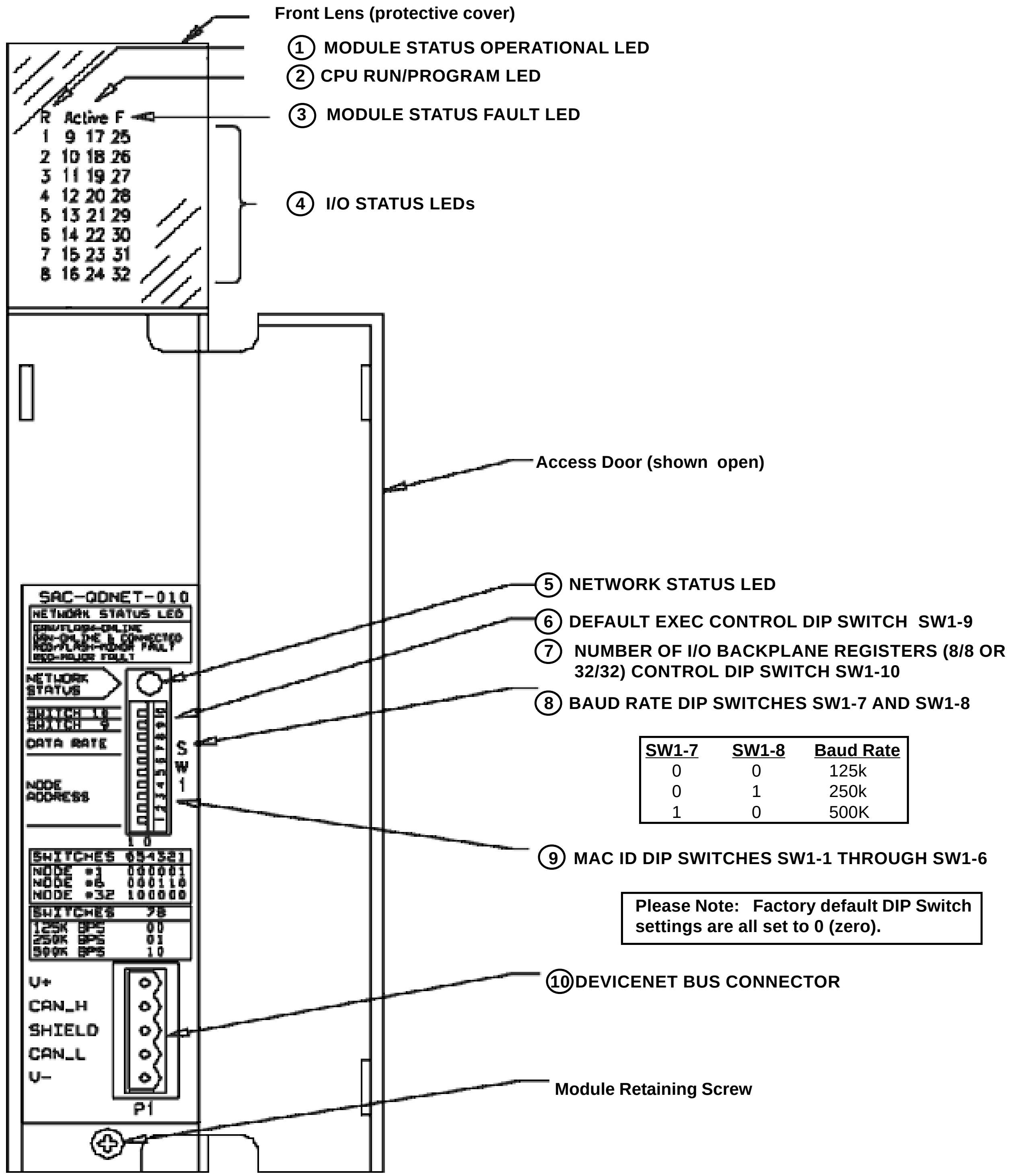
2.9 Network Address 00-63

2.10 Environmental Conditions:

Operating Temperature .... 32 to 140 °F (0 to 60 °C)
Storage Temperature ....-40 to + 185 °F (-40 to +85 °C)
Humidity ....5 to 95% noncondensing
Shock (unpacked):
Operating 30g
Nonoperating 50g
Vibration (unpacked) ....5g from 10 to 500 Hz

3. Hardware Configuration

THE NUMBERED SWITCHES AND INDICATORS THAT ARE CALLED OUT IN THE FIGURE BELOW ARE DISCUSSED IN GREATER DETAIL ON SUBSEQUENT PAGES — SEE PARAGRAPH WITH THE CORRESPONDING CALLOUT NUMBER (IN THE CIRCLE) FOR MORE INFORMATION.



SW1-7	SW1-8	Baud Rate
0	0	125k
0	1	250k
1	0	500K

Please Note: Factory default DIP Switch settings are all set to 0 (zero).

3.1 Description of Switches and Indicators

① MODULE STATUS OPERATIONAL LED — R

This green LED provides device status. It indicates whether or not the device has power and is operating properly. **Table 1** defines the Module Status Operational LED states and the Module Status Fault LED (see 3, below) as they work in conjunction to indicate the device state.

② CPU RUN/PROGRAM LED — ACTIVE

This green LED provides the TSX Quantum CPU Run/Program status. If the LED is OFF, the CPU is in Program Mode. If the LED is ON, the CPU is in Run Mode.

③ MODULE STATUS FAULT LED — F

The red LED provides device fault status. It indicates whether the device is in an unrecoverable or recoverable fault. See Table 1, below for the Module Status Fault LED states and indications.

> ***IMPORTANT NOTE: When the device is self-testing, the Module Status Operational LED and the Module Status Fault LED will flash alternately.***

Table 1. Module Status Operational and Module Status Fault LED States

MODULE STATUS OPERATIONAL R LED (GREEN) IS:	MODULE STATUS FAULT F LED (RED) IS:	FOR THIS STATE:	TO INDICATE:
OFF	OFF	No power	There is no power applied to the device.
GREEN	OFF	Device operational	The device is operating in a normal conditior
FLASHING GREEN	OFF	Device in standby (needs reconfiguring)	The device has missing, incomplete or incorrect configuration.
OFF	FLASHING RED	Minor fault	The device is in a recoverable fault.
OFF	RED	Unrecoverable fault	The device is in an unrecoverable fault and may need replacing.
FLASHING GREEN	FLASHING RED	Testing	Device is performing self-tests.

④ I/O STATUS LEDS — 1 THROUGH 32

These green LEDs provide information concerning the states of input and/or output. The intent of the I/O status LEDs is to inform the user whether the first 32 input bits or the first 32 output bits, or the first 16 input/16 output bits, are in an ON or OFF condition.

If the LED is OFF, its associated input/output is in an OFF condition. If the LED is ON, its associated input/output is in an ON condition. Whether the LEDs represent the first 2 input registers, the first 2 output registers, or the first input register/first output register, these three combinations are defined by Modicon Bits 0 through 11 in Output Word 1. (See **Section 6.3, Definitions for I/O Word 1**, for more information.)

⑤ NETWORK STATUS LED

This two-color (green/red) LED indicates the status of the DeviceNet communication link. **Table 2** defines the Network Status LED states.

Table 2. Network Status LED States

LED IS:	FOR THIS STATE:	TO INDICATE:
OFF	Not powered/not online	Device is not online: a. The device has not completed the Dup_MAC_ID test yet. b. The device may not be powered, look at Module Status LED.
FLASHING GREEN	Online, not connected	Device is online, but has no connections in the established state. The device has passed the Dup_MAC_ID test, is online, but has no established connection to other nodes.
GREEN	Online, connected link OK	The device is online and has connections in the established state.
RED	Critical Link Failure	Failed communication device. The device has detected an error that has rendered it incapable of communicating on the network: a. loss of network power. b. duplicate MAC ID, or buss OFF

IMPORTANT NOTE: DIP switch settings do not take effect until power is cycled to the scanner.

⑥ DEFAULT EXEC CONTROL DIP SWITCH SW1-9

When in the “1” position, this switch will force the scanner to use a default exec. Any uploaded exec in the module will be ignored. ***This can change functionality of the module!*** This switch must be in the “0” position for any changes made in a new uploaded exec to take effect.

⑦ NUMBER OF I/O REGISTERS CONTROL DIP SWITCH SW1-10

This switch will determine the number of I/O registers the scanner consumes in a Quantum rack. With the switch is in the “1” position, the scanner uses 32 words of input and 32 words of output. In the “0” position the scanner uses 8 words of input and 8 words of output.

⑧ BAUD RATE DIP SWITCHES SW1-7 AND SW1-8

DIP Switches SW1-7 and SW1-8 control the link data rate (Baud Rate). There are 3 Baud Rates to choose from: 125kbps, 250kbps, 500kbps. The Baud Rate settings are printed in a chart on the front plate of the unit below the DIP Switch SW1. A switch positioned to the left represents a 1 on the chart and a switch positioned to the right represents a 0 on the chart. (See Table 3, below.)

Data rates for the DeviceNet communication link are determined by the type of transmission media (DeviceNet Thick Cable or DeviceNet Thin Cable) and the maximum cable distance. Refer to DeviceNet's physical layer requirements for correct data rates with cable distances.

Table 3. Baud Rates

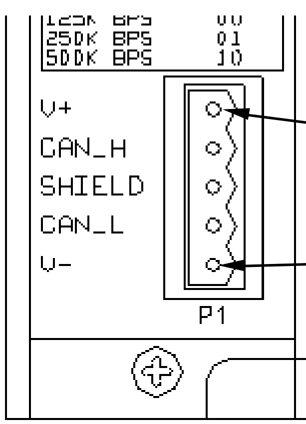
SW1-7	SW1-8	Baud Rate
0	0	125k
0	1	250k
1	0	500k

(9) MAC ID DIP SWITCHES SW1-1 THROUGH SW1-6

DIP Switches SW1-1 through SW1-6 indicate the DeviceNet Node Address or MAC ID. The ID number is in binary format with the least significant bit (LSB) on SW1-1 and the most significant bit (MSB) on SW1-6. There are 64 possible nodes. Example node switch settings are printed in a chart on the front plate below DIP Switch SW1. A switch positioned to the left represents a 1 on the chart and a switch positioned to the right represents a 0 on the chart.

(10) DEVICENET BUS CONNECTOR

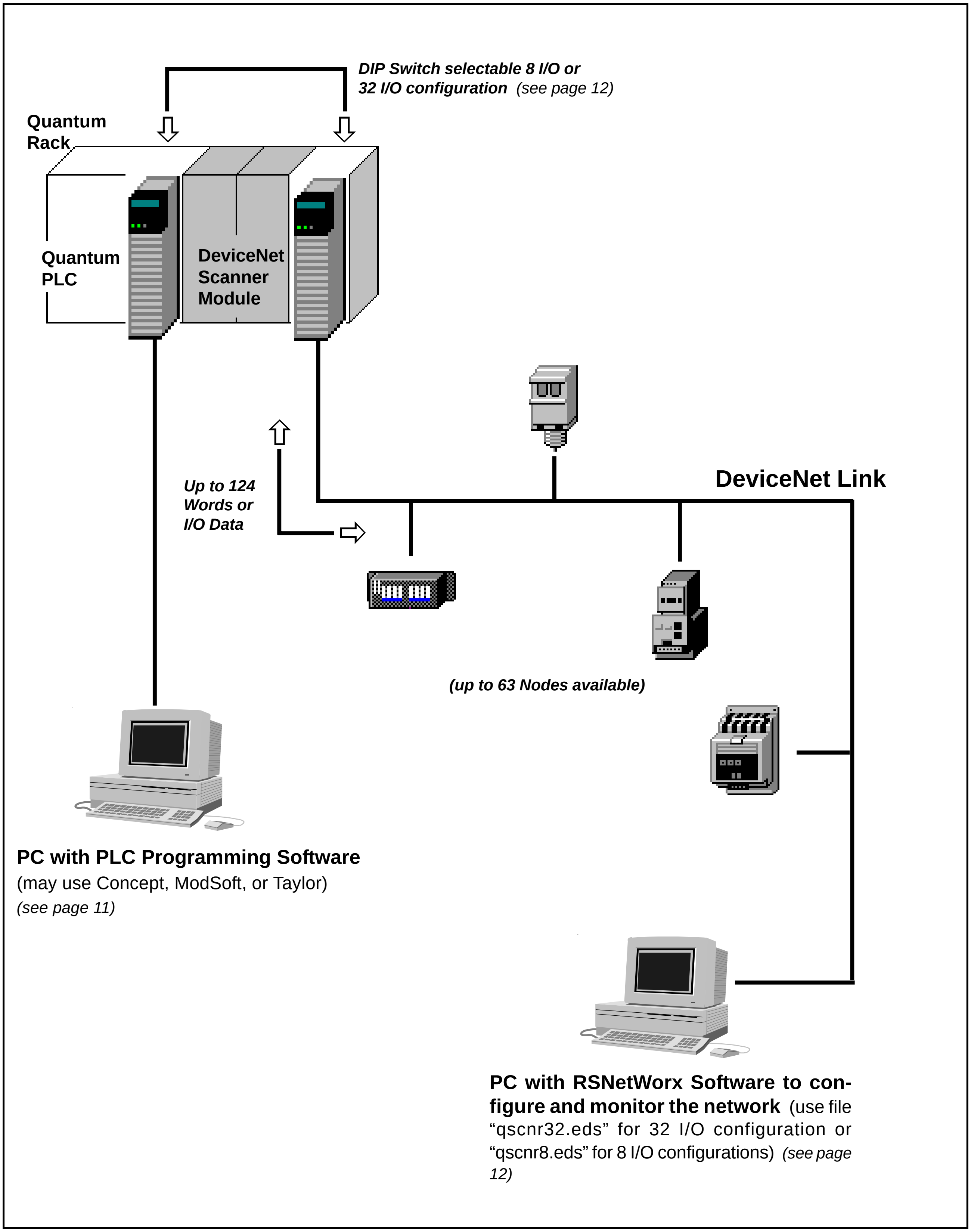
The TSX Quantum DeviceNet Scanner represents an isolated node with transceiver powered by the network. The following is the connectors pinout definition. Pin #1 is toward the bottom of the connector (shown below).



Pin #	Wire Color	Definition
5	Red	V+ (+24 VDC nominal)
4	White	CAN_H (high CAN communication signal)
3	Bare	SHIELD or DRAIN (cable shield)
2	Blue	CAN_L (low CAN communication signal)
1	Black	V- (reference for +24 VDC)

IMPORTANT NOTE: There is no terminating resistor inside the scanner. Terminating resistors (120 Ω) should be installed between the CAN.H and CAN.L terminals at the two ends of the communication line.

3.2 Diagram of Module in Typical System



4. Power-up Sequence for LED Block

Upon power-up, a sequence of tests are performed internal to the scanner. The results of these tests are displayed on the LED block. The tests are as follows:

> ***IMPORTANT NOTE: R and F will not alternate during Data RAM test.***

1. The LED block is tested. R turns **ON/OFF**, Active turns **ON/OFF**, F turns **ON/OFF**. All 32 LEDs turn **ON/OFF** in order.

2. The DIP switches are tested. Any switch 1-10 in the **1** position will illuminate the appropriate LED number for 4 seconds.

3. LED 1 turns **ON** indicating the Data RAM is being tested. If the LED remains **ON** there was a failure with Data RAM.

> ***IMPORTANT NOTE: If DIP Switch 1, position 9 is "ON," LED 2 never turns ON (it ignores upload exec.)***

4. LED 2 turns **ON** indicating a CRC check is being performed on any uploaded EXEC. If no valid uploaded EXEC is found the LED flashes four times and turns **OFF**.

5. LED 3 turns **ON** indicating a CRC check is being performed on the Boot Code. If the LED remains **ON**, there was a failure with the Boot Code.

6. LED 4 turns **ON** indicating a CRC check is being performed on the RAM Code, either from boot or an uploaded EXEC. If the LED stays **ON,** there was a failure with the RAM Code.

7. LED 5 turns **ON** indicating the Dual Port RAM is being tested. If the LED remains **ON**, there was a failure with Dual Port RAM.

8. **R** indicates the scanner module status is healthy. **F** indicates an unrecoverable fault. Active is **ON** if the controller is in Run/Start Mode and **OFF** if the controller is in Stop/Program Mode.

> ***IMPORTANT NOTE: If any of tests 3 to 7 fail, the LED for each failed test will <u>REMAIN ON FOR 10 SECONDS.</u> Bit 14 will also be set in the Status Word. The scanner will continue to operate in this "failed" state.***

5. Quantum Backplane Configuration

You may use configuration software from: Concept, ModSoft, or Taylor. (Please consult AVG Technical Support for additional configuration software options.) The scanner can be assigned to Words or Discrete Registers (see section 6.3).

5.1 Using DeviceNet Scanner with Concept Software:

There is one ".MDC" file and one ".HLP" file in the accompanying disks. Install the ".MDC" file with Concept's ModConnect tool.

5.2 Using DeviceNet Scanner with ModSoft Software:

IMPORTANT NOTE: Modsoft Software is not available from AVG Automation. For any revisions or updates to this software, you will have to contact Modicon or your Modicon distributor.

The BusModule description must be added to the file "\MODSOFT\RUNTIME\GCNFTCOP.SYS." To perform this modification, first back up your existing file "GCNFTCOP.SYS." Then insert the 10F90 disk and type "A:\ADD_AVG."

IMPORTANT NOTE: If you receive updated software for Modsoft with a revision before (revision) 2.4, you will have to install the updated software and then run "ADD_AVG." "ADD_AVG" requires at least Rev 2.4 of Modsoft.

An example for an existing file is provided in the figure, below. Please note that after step 4, select an open slot for module configuration, then press the "?" key for Quantum I/O list of available modules, and select DEV NET 32, and then enter the starting input address, and starting output address shown in the example below. Proceed to step 5.

5.3 Using DeviceNet Scanner with Taylor Software:

Taylor Software Version 1.4 recognizes AVG's DeviceNet Scanner Module. No separate file is needed.

Modsoft Screen (Example)

1. Offline (F2)
2. Select Program
3. Config (F5)
4. I/O Map (F4)

I/O Map

Slot	Module	Input Ref	Output Ref	Description
101	CPS111xx			
102	CPUx130x			
103				
104	DEV NET 32	300001-300032	400001-400032	DNET SCANNER 32

5. Select QUIT (or press F9) twice
6. SAVE (F7)
7. QUIT (F9)
8. Transfer (F5) File to PLC
9. ESC
10. Online (F3) Select Program
11. Config (F5)
12. I/O Map (F4)

105	*DEV NET 32	300001-300032	400001-400032

if *DEV NET 32 — does not recognize module (repeat the above steps)

6. DeviceNet Scanner Module Configuration

Configuration of this module involves installing the .EDS files and mapping devices.

6.1 Installing EDS Files

Before you configure the Scanner, you must install the .EDS files. RSNetWorx and RSLinx cannot recognize the scanner until you have installed the .EDS files from the 10F90 disk provided by AVG. **Use file “qscnr32.eds”, for 32 I/O configuration or “qscnr8.eds” for 8 I/O configurations.** This is accomplished through RSNetworx by choosing View > Tools > EDS Wizard, and following the instructions found there.

6.2 Mapping

The input/output table displayed in RSNetWorx represents four equal “banks” of registers. Each of these banks can then be accessed, one at a time, through the Modicon backplane. The bank is selected by entering either a binary 0,1,2, or 3 in bits 2–4 of Modicon Output Word 1 (Control Word). The default bank is “0”. The first register of each bank is accessed through the second Modicon register defined for the module. In 32 in/out mode, the scanner then has 31 x 4, or 124, entries in the input table and 124 entries in the output table of RSNetWorx. For 8 in/out mode the scanner has 7 x 4, or 28, entries in the input and 28 entries in the output table.

Example:

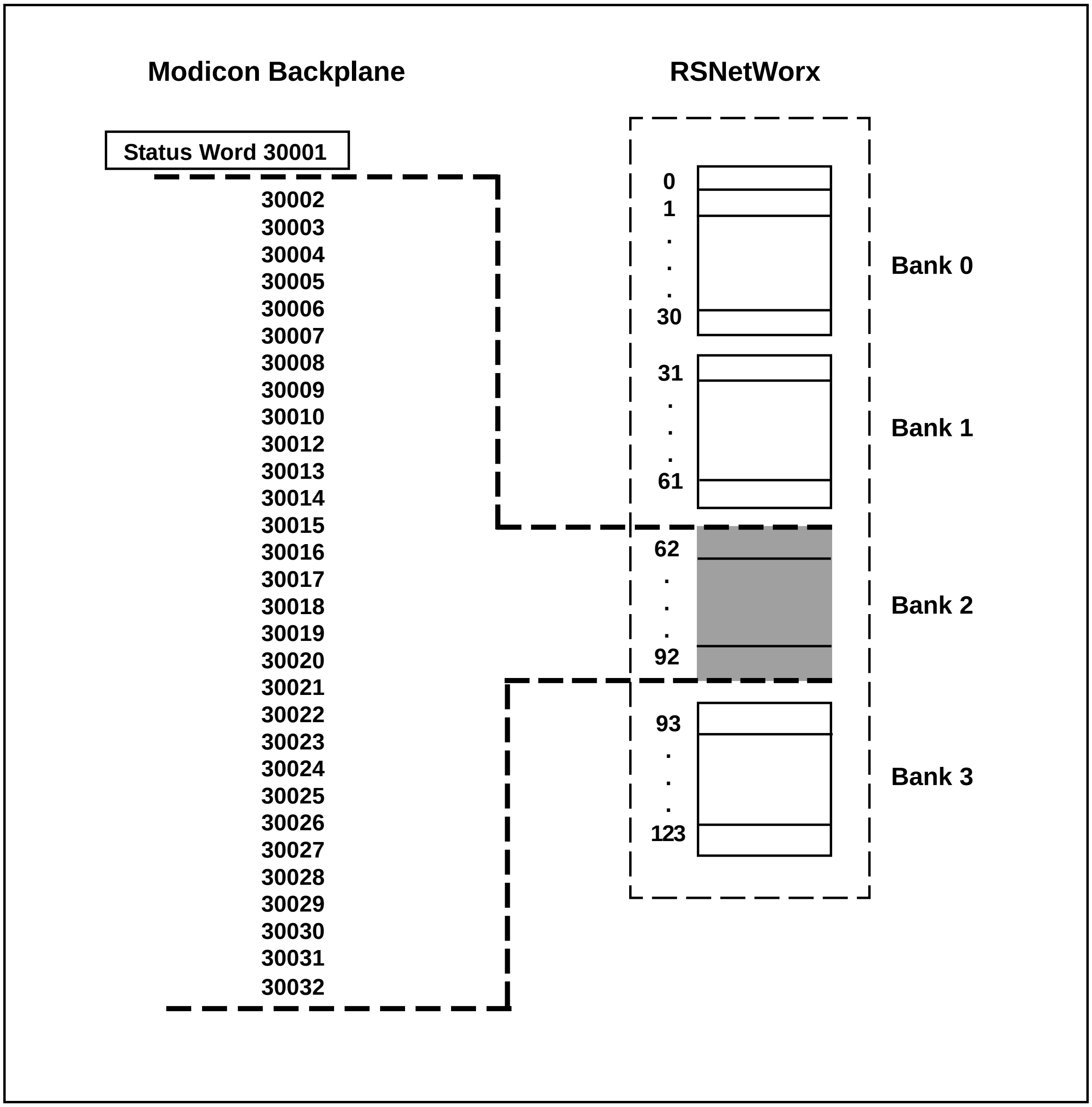
Say the scanner is defined as using registers 300001-300032 and 400001-400032. Registers 300001 and 400001 are reserved for the **Status Word** and **Control Word**, respectively. Register 300002 corresponds with table entry “0” of the input table in RSNetWorx. Register 400002 corresponds with table entry “0” of the output table in RSNetWorx. Register 300003 uses input table entry “1” and register 400003 uses output table entry “1,” etc.

If we change bits 2–4 in the Control Word, a new bank is selected. The handshake for this selection is returned in bits 9–11 of Modicon Input Word 1 (Status Word).

IMPORTANT NOTE: IN THE PLC LADDER LOGIC, THE PLC DATA OUTPUTS SHOULD LEAVE THE PLC IN THE SAME SCAN AS THE BANK SELECTION CONTROL BITS (2–4) IN OUTPUT WORD 1. FURTHERMORE, THE INPUTS READ ARE NOT VALID UNTIL THE REQUESTED BANK IS ECHOED BACK IN BITS 9–11 OF THE STATUS WORD.

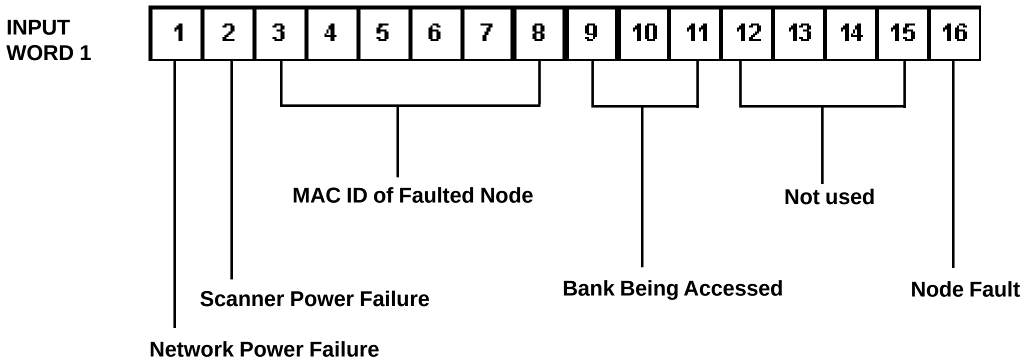
If bits 2–4 are changed in the above example, registers 300002-300032 access a different portion of the RSNetWorx input/output tables (remember 300001 is used for the Status Word).

If we set the bank to “2”, the registers 300002–300032 correspond to entries 62–92 in the RSNetWorx input table. Refer to the illustration on the next page (13). Setting the bank to “1” changes the correspondence to 31–61. Setting the bank to “3” changes it to 93–123. 124 different registers can be mapped for input data and 124 mapped for output data.


Modicon Backplane
RSNetWorx
Status Word 30001
30002
30003
30004
30005
30006
30007
30008
30009
30010
30012
30013
30014
30015
30016
30017
30018
30019
30020
30021
30022
30023
30024
30025
30026
30027
30028
30029
30030
30031
30032
0
1
30
Bank 0
31
61
Bank 1
62
92
Bank 2
93
123
Bank 3

6.3 Definitions for I/O Word 1— I/O Bits 1-16

6.3.1 INPUT WORD 1 (Register Mode): This is a status word from the Scanner to the Modicon PLC. The 16 bits are defined as:



16 **Node Fault** — this indicates that a Node has faulted

12–15 **Not used**

9–11 **Bank being accessed** — Bit 9 is MSB* for decimal value.

Bank	9	10	11
0	0	0	0
1	0	0	1
2	0	1	0
3	0	1	1
4 (Fault Bank)	1	0	0

3–8 **MAC ID of Faulted Node** — this identifies which Node has faulted. Node faults are detected in increasing order from Node 0 to Node 63. The first detected faulted Node is the only one displayed in the status bits. Bit 3 is MSB for decimal value.

2 **Scanner Power-up Fault** — the scanner failed a power-up test.

1 **Network Power Failure** — there is no network power.

6.3.2 INPUT BITS 100001–100016 (Discrete Mode): These are status bits from the Scanner to the Modicon PLC. The 16 bits are defined as:

100016 **Node Fault** — this indicates a node has faulted.

100012–100015 **Not used**

**** MSB stands for Most Significant Bit (LSB is Least Significant Bit)***

100009–100011 **Bank being accessed** — Bit 100009 is MSB.

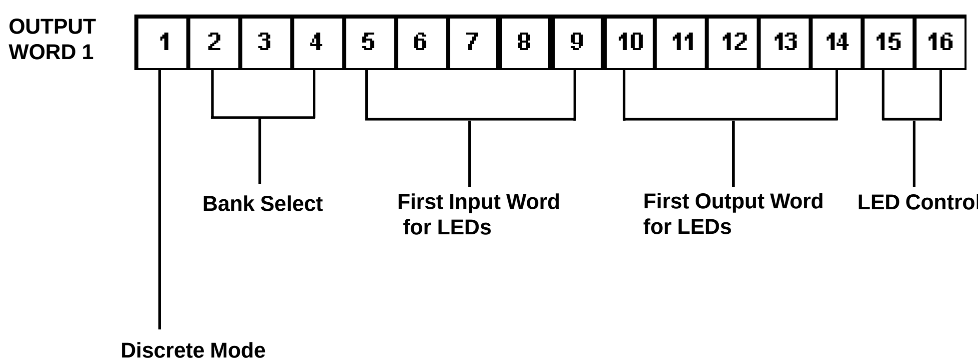
Bank	100009	100010	100011
0	0	0	0
1	0	0	1
2	0	1	0
3	0	1	1
4 (Fault Bank)	1	0	0

100003–100008 **MAC ID of Faulted Node** — this identifies which Node has faulted. Node faults are detected in increasing order from Node 0 to Node 63. The first detected faulted Node is the only one displayed in the status bits. Bit 100003 is MSB.

100002 **Scanner Power-up Fault** — the scanner failed a power-up test.

100001 **Network Power Failure** — there is no network power.

6.3.3 OUTPUT WORD 1 (Register Mode): This is a word from the Modicon PLC to the scanner.



Bits 15–16 **LED Control — LEDs 1–32** on the LED block can be mapped to the Quantum I/O registers in 4 ways.

<u>Bit 15</u>	<u>Bit 16</u>	
0	0	LEDs 1–16 are mapped to the first word of input data, LEDs 17–32 to the first word of output data.
0	1	LEDs 1–32 are mapped to the first two words of output data.
1	0	LEDs 1–32 are mapped to the first two words of input data.
1	1	LEDs are unused.

Bits 10–14 **First Output Word** — a value 1–32 indicating the least significant digit of the Modicon output word to be mapped to the LEDs. Bit 10 is MSB for decimal value.

Bits 5–9 **First Input Word** — a value 1–32 indicating the least significant digit of the Modicon input word to be mapped to the LEDs. Bit 5 is MSB for decimal value.

Bits 2–4 **Bank Select —** Bit 2 is MSB for decimal value.

Bank	2	3	4
0	0	0	0
1	0	0	1
2	0	1	0
3	0	1	1
4 (Fault Bank)	1	0	0

Bit 1 **Discrete Mode —** Refer to Section 7 of this manual.

6.3.4 OUTPUT BITS 000001–000016 (Discrete Mode): These are bits from the Modicon PLC to the scanner.

000015–000016 **LEDs 1–32** on the LED block can be mapped to the Quantum I/O registers in 4 ways.

Bit 000015	Bit 000016	
0	0	LEDs 1–16 are mapped to the first word of input data, LEDs 17–32 to the first word of output data.
0	1	LEDs 1–32 are mapped to the first two words of output data.
1	0	LEDs 1–32 are mapped to the first two words of input data.
1	1	LEDs are unused.

000014–000010 **First Block of Output Bits** — a value 1–32 indicating a 16 bit block of Modicon output bits to be mapped to the LEDs. (See table below.) Bit 000010 MSB.

16 bit block to map to LEDs

0, 1	=	000001 – 000016
2	=	000017 – 000032
3	=	000033 – 000048
(etc.)		

000009–000005 **First Block of Input Bits** — a value 1–32 indicating a 16 bit block of Modicon input bits to be mapped to the LEDs. (See table below.) Bit 000005 is MSB.

16 bit block to map to LEDs

0, 1	=	100001 – 100016
2	=	100017 – 100032
3	=	100033 – 100048
(etc.)		

000004–000002 **Bank Select —** Bit 000002 is MSB.

Bank	000002	000003	000004
0	0	0	0
1	0	0	1
2	0	1	0
3	0	1	1
4 (Fault Bank)	1	0	0

000001 **Discrete Mode —** Refer to Section 7 of this manual.

6.3.5 FAULT BANK (Bank 4)

Selecting **Bank 4** in **Control Word/Control Bits** shows the Node status of all 64 nodes on the network. The first input register in the bank is still reserved for the **Status Word**. The next four words indicate the health of each Node on the network. There is one bit for each of the 64 Nodes and, therefore, four 16-bit registers total. If the bit is a “0”, the Node is healthy. If it is “1”, the Node is faulted. The remaining registers in the bank are used to display each **Node Number** and its **Fault Code** (see paragraph 6.3.6, next page, for Node Fault Codes.)

Example: If the scanner is mapped to 300001–300008:

300001 will show the Status Word information																
Bit #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Node #																
300002	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
300003	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
300004	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32
300005	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48
300006	Node number (1–8, 1 MSB)								Fault Code (9–16, 9 MSB)							
300007	Node number (1–8, 1 MSB)								Fault Code (9–16, 9 MSB)							
300008	Node number (1–8, 1 MSB)								Fault Code (9–16, 9 MSB)							

6.3.6 NODE FAULT CODES

Following is a list of Node Faults for the Quantum DeviceNet Scanner.

1 Failed DUP MAC check.
2 Illegal value in Scan List.
3 Device stopped communicating.
4 Device does not match Scan List.
5 Port has detected data overrun.
6 Network comm have failed.
7 Timeout with no net traffic for scanner.
8 Data size returned not match Scan List.
9 Device in Scan List not answering.
10 Port failed to transmit msg.
11 Port is in IDLE MODE operation.
12 Port is in FAULT MODE operation.
13 I/O fragment out-of-sequence.
14 Device refused to be init'ed.
15 Device not yet init'ed.
16 Data too big for frag buffer.
17 Device went into idle itself.
18 Shared master has not allocated slave.
19 Shared master has not allocated required choices.
20 Keeper download failed.
21 User has disabled port.
22 Bus Off detected on port.
23 No power on CAN transceiver.

26 Appl FLASH is being modified by tool.
27 Port is in TEST MODE operation.
28 User halted scanner.
29 Esc,Overflow,Divide or other proc err.
30 Watchdog has timed-out.

6.4 Configuring the Scanner — Quick Start

Upon initial power-up, the scanner will need to be configured. This configuration is then saved to the Scanner Module FLASH memory and will remain for future power cycling. The configuration is performed using RSNetWorx™. (For more detail concerning configuration of the scanner, see the following **Section 6.5 on page 20**.)

1. Setup an online connection.
2. Double click on Modicon Quantum Scanner Icon. A right click and device properties selection will display the device name of each icon.
3. Select Scanlist tab.
4. Highlight devices to be scanned in the “available” window. Press the “>” button to move the devices to the Scanlist.
5. The devices to be scanned appear in a list on the screen. Each device is identified by its MAC ID.
6. Select a node from the list.
7. Select Edit I/O Parameters.
8. Choose a connection type (Polled, COS, Strobe), and the number of Rx (receive) and Tx (transmit) bytes for the node.
9. Choose OK.
10. Click on either the “Input” or “Output” tab. This allows you to choose specific bit locations of the 124 Input / 124 Output words available to the Modicon Quantum PLC Backplane in four banks of 31 words each.

> ***IMPORTANT NOTE: The Modicon Quantum PLC I/O words are retentive until power is cycled to the scanner module. Any I/O bits mapped to devices will retain the values set by the device, even if the device is removed from the scan list. The only way to clear the I/O bits relinquished by a device is to map another device to those bits or cycle power to the scanner module.***

11. Highlight the device to “map” from the DeviceList.
12. Select the starting word for the device. Bytes mapped can’t overlap between devices. The newly selected map entry will overwrite any existing bits mapped to the same location.
13. Click on “Automap.”
14. The Quantum PLC must now be set to Program/Stop mode.
15. The Foreground to Background poll ratio can also be set. This allows some devices to produce/consume I/O data at a rate equal to some set multiple of the foreground EPR.
16. Click on “Apply.”

17. Click on “Module.” The interscan delay time (ISD) can be set at the present screen. The ISD time is the time delay between the last I/O message from the slaves and the resending of the strobe and/or poll commands.

18. Click on OK.

6.5 Configuring the Scanner through RSNetWorx™ Software — Details

(RSNetWorx™ is not available from AVG Automation. Upgrades or revisions are available from Rockwell Software or your Allen-Bradley/Rockwell Automation distributor.)

To configure your Quantum Scanner, you will need to know how to use the following RSNetWorx Software screens (see RSNetWorx Manual for more information):

- **Module Configuration**
- **Scan List Editor**
- **Edit Device I/O Parameters**
- **Auto Map**
- **Data Table Map**
- **Upload**
- **Download**

> ***IMPORTANT NOTE: It is important that you are familiar with data mapping and have a mapping scheme planned for your Quantum Scanner network before continuing. We further recommend that you thoroughly read the following procedures before attempting to configure your scanner. (See previous section, 6.2, for mapping information.)***

6.5.1 Online and Offline Configuration

You can configure your Quantum Scanner module in an online or offline mode. The following illustrates a typical process for each mode.

ONLINE

1. Load settings into the configuration utility (editor)
   — from a previously stored file.
   — from the Quantum Scanner module’s nonvolatile memory.

2. Save settings to the Quantum Scanner.

3. (optional) Save settings to a file.

OFFLINE

1. Enter all device data and configuration settings.

2. Store settings in the project. Settings are saved using file references.

6.5.2 Configuration Screen

The Module Configuration screen is the screen from which all other Quantum Scanner configuration screens are reached.

Accessing the Module Configuration Screen

To access the Module Configuration screen, the screen from which all other Quantum Scanner configuration screens are reached, double-click on the Quantum Scanner icon.

When there is more than one scanner in the Project or Network Who screen, you can tell what scanner a device belongs to by the tree displayed under View, Tools, Master/ Slave Configuration.

The module configuration screen allows you to set the Quantum Scanner scanner's module operational parameters and identify PLC addresses for input and output data.

> ***Before configuring the Quantum Scanner Module,*** *RSNetworx must be editing online****. Perform*** *network browse* ***to allow RSNetworx to find the scanner. Ensure that the scanner module is*** *NOT in Run Mode****.***

Setting the Module's Operational Parameters:

1. Click on the **Module** tab to change the scanner's operational parameters.

2. Enter the time the scanner waits between scans (between 2 and 9000 milliseconds in the **Interscan Delay** edit box. The default Interscan Delay is 10 milliseconds.

3. Enter the ratio of foreground to background polls (between 1 and 65535) in the **Foreground to Bkgd Poll Ratio** edit box.

Devices can be polled a background rate instead of every scan. Whether a device is polled every scan or at a background rate is determined in the Edit I/O Parameters screen (discussed later). For example, if the value of 5 is set, the scanner polls the selected device(s) once every six scans.

CAUTION

CHANGING ADVANCED SETTINGS MAY DISRUPT NETWORK COMMUNICATION. DO NOT MODIFY UNLESS INSTRUCTED TO DO SO BY A TECHNICAL SUPPORT REPRESENTATIVE. THE DEFAULT VALUE FOR EXPECTED PACKET RATE IS 75 MSEC. THE DEFAULT FOR TRANSMIT RETRIES IS 1.

4. To load data from your scanner's nonvolatile memory, click on **Upload from Scanner**.

   To load module defaults from your scanner, in the Load From field, choose **Module Defaults**.

5. Save your data: To Save data to your scanner's nonvolatile memory (this induces a flash-memory update if the scanner is in idle mode), choose **Download to Scanner**.

6.5.3 Using the Scan List Editor Screen

The Quantum Scanner Scan List Editor screen displays a summary of the available network residing in the Module Configuration screen.

Scan List Editor Functions

Click on **Scanlist** to reach the Scan List Editor Screen.

The Quantum Scanner Scan List Editor screen displays a summary of the available network residing in the Module configuration screen and allows you to determine I/O and data-mapping preferences.

The Scan List Editor screen supports a multiple-selection method. You can select multiple devices for edit at one time (these devices do not have to be consecutive). For example, you can choose nodes 1 and 2, then skip to nodes 5 and 10. You do not have to choose the nodes between 2 and 5, or 5 and 10. Highlight the specific nodes or range of nodes, then choose the desired function.

Viewing Device Information in the Scan List

1. Set the loading options.

IMPORTANT NOTE: The software does not include the scanner or itself in the scan list it builds.

   To load data from your scanner's nonvolatile memory, in the Load From filed, choose **Upload from Scanner**.

   The screen is automatically updated with what is received from the scanner.

2. Click on the Node Active in Scanlist check box to include the device in the scan cycle.

3. Click on the appropriate check boxes in the Electronic Key field that you wish to facilitate device-record keying.

   These items are a list of criteria that you can customize to fit your application’s specific needs. An “X” in an item’s box indicates that it is an active keying parameter. These selections are hierarchical in descending order. For example, you cannot choose Vendor without Device Type.

4. Save your data: To Save data to your scanner’s nonvolatile memory (this induces a flash-memory update if the scanner is in idle mode), choose **Download to Scanner**.

Removing Devices from the Scan List

To remove devices from the scan list in the Scan List Editor screen, highlight the device(s) you want to eliminate and choose “<“ so that they move from **Scan List** to **Available**.

Adding Devices to the Scan List from the Scan List Editor Screen

Follow these directions to add devices to you scan list from the scan list editor.

1. Choose the appropriate tab on the **Scan List Editor** Screen.
   You will see the Available Devices and Scan List screen.

2. To add a device to a scanner’s scan list, click on the device listed in the Available screen with the left mouse button and then click on “>”.

3. Once you’ve made your changes, choose OK.

Configuring a Device in the Scan List

1. To edit your device’s I/O communication parameters, choose Edit I/O Parameters.

   When editing your devices, you can select one device or multiple devices at a time. Highlight the desired devices and choose Edit I/O Parameters. The entries made are then applied to all highlighted devices.

2. Click on the Enabled check box in the appropriate field, depending upon whether your device is strobed, polled, change-of-state, or cyclic.

> ***IMPORTANT NOTE: Once you click on the check box next to Enabled in the change of state/cyclic field, you must click on the appropriate button next to change-of-state or cyclic, depending upon your device.***

For this messaging type :	***Enter:***
Strobed	Strobed sizes
Polled	Polled sizes and poll rate
Change-of-state	I/O size and heartbeat
Cyclic	I/O size and send rate

To have RSNetWorx Software set the EDS file to the default setting, choose **Restore I/O Sizes.**

CAUTION

CHANGING ADVANCED SETTINGS MAY DISRUPT NETWORK COMMUNICATION. DO NOT MODIFY UNLESS INSTRUCTED TO DO SO BY A TECHNICAL SUPPORT REPRESENTATIVE. THE DEFAULT VALUE FOR TIMEOUT IS 16 MSEC. THE DEFAULT FOR INHIBIT TIME IS 1 MSEC.

3. Choose **OK**. You will return to the Scan List Editor screen.

4. Save your data: To Save data to your scanner's nonvolatile memory (this induces a flash-memory update if the scanner is in idle mode), choose **Download to Scanner**.

Determining Data-Mapping Preferences with Auto Map

For simpler and faster data mapping, use the Auto Map function to map noncritical I/O devices and use the Advanced Map screen to manually map critical I/O Devices. You could use Auto Map as a "first-pass" mapping procedure and the Advanced Mapping method as a "fine-tuning" procedure.

1. Click on the Input and/or Output tab, depending upon your device.

File Type	***Designates***
Input	Locations within your processor to which the selected device's data is mapped
Output	Where data destined for the selected device resides in your processor's memory

2. Select the device(s) you would like to map in the scan list so it is highlighted.

3. Enter the appropriate word within the region where the data begins in the start Word edit box.

4. Choose **Auto Map**.

5. Click on **Options.** The Options screen will appear.

This mapping method	Maps
Byte Align All	All data on byte boundaries in incrementing node address order
Word Align All	All data on word boundaries in incrementing node address order

> ***IMPORTANT NOTE: If you have a device that has already been mapped, you have the option to reverse the process. Unmap does not delete the selected device from the scan list, but only removes any data mapping for the selected device.***

6. To map the selected device's data, click on **Apply.**

6.5.4 About the Data Table Map and Advanced Settings

The Advanced Map screen facilitates customized data mapping. You can specify exact memory locations and data sizes (in bits) for your I/O data communication. In addition, it provides a useful browsing tool for scan list data table-map viewing.

When the Input Data Map or Output Data Map screens appear, you will find the following buttons: **Automap, Unmap, Advanced and Options.** Click on **Advanced** and you will find **Apply Mapping and Delete Mapping.**

The **Apply Mapping** button inserts the values from the Data Entry fields into your scan list's data table map.

The **Delete Mapping** button removes selected devices from a data table map. This button deletes a device's data from the scan list. A device whose data is not mapped is not scanned. The only exception is in the case of a strobe-out, which has no map requirement.

Using the Data Table Map for Custom Editing for Input

You can select specific bits of input data and map them to specific scanner memory locations by following these directions.

1. To edit the data table map, click on the tab **Input**.

   Select a device to edit from the drop list.

2. Click on the **Advanced** tab.

3. Click on the desired input data's location in the **Map From** Field.

   This indicates to the scanner which type of message will arrive — strobe, poll, change-of-state, or cyclic. This entry must match the type of communication you chose when defining the device's communication characteristics in the Edit I/O Parameters screen.

4. Enter the location of the input data by indicating where in the DeviceNet message to begin mapping input bits in the Byte and Bit edit boxes.

   You need to indicate the exact byte and bit location.

5. Click on the desired location in your scanner's memory where you want to store the input data in the **Map To** Field.

6. Enter the input data's mapping location by indicating the word and bit at which the data begins in your scanner's memory in the Word and Bit edit boxes.

7. Enter the size of the input data you are mapping to the location in the Map Data To field in the Bit Length edit box.

> ***IMPORTANT NOTE: The input value must be equal to or less than the strobe, poll, change-of-state, or cyclic receive value entered when defining communication characteristics in the Edit I/O Parameters screen.***

8. Click on **Apply Mapping**.

9. Click on close.

Using the Data Table Map for Custom Editing for Output

1. To edit the data table map, click on the tab **Output.** Once you've completed the following procedure, the map data is displayed in the appropriate position within the Datatable Map window (on your Input or Output table).

2. Select a device to edit in the drop list.

3. Click on **Advanced**.

4. Click on the appropriate Segment in the Map Segment window.

5. Click on the desired type of message to put the output data in the **Map From** field.

   You must choose in what type of message the output is sent to your device.

6. Enter the location of the output data by indicating where in the DeviceNet message to begin mapping output bits in the Byte and Bit edit boxes.

   You need to indicate the exact byte and bit location.

7. Click on the desired location in your scanner's memory to retrieve the output data in the **Map To** field.

8. Enter the output data's mapping location by indicating the word and bit at which the data begins in your scanner's memory in the Word and Bit edit boxes.

9. Enter the size of the output data you are mapping from the location in the **Map To** field in the No. Bits edit box.

10. Click on **Apply Mapping**.

11. Click on Close.

If You Encounter Error Messages

If you encounter error messages while building your scanlist file, refer to the trouble-shooting table (page 32).

7. Discrete Mode

The bit order of data going through the Modicon backplane can be reversed. This is used when the Module is mapped in Discrete Mode. Normally, the least significant bit of registers mapped to DeviceNet is on the right side of the word. By setting **Control Word Bit 1**, the least significant bit is moved to the left side of the word. This reversal only applies to **Modicon Bits** after the first 16 **Control Bits.** The **Control Bits and Status Bits** cannot be reversed.

Example: We have the scanner in 8 I/O Configuration (Mode). The scanner is mapped to Modicon input registers 100001-100128 and output registers 000001-000128. We have the Bank defaulted to "0". Input table 0 in RSNetWorx is mapped to a **Photoeye** device requiring 16 bits of status and data information. The **Photoeye** defines two data bits on the right side of the word as the least significant bits (bits 1-0). With **Control Bit 1** set to "1", Modicon bits 100017 and 100018 will show the **Photoeye data bits**. Clearing **Control Bit 1** causes **Modicon Bits** 100031 and 100032 to show the **Photoeye data bits**.

Control Bit 1 Set

Control Bit 1 Set →	000001	1	D
	000002	0	E
	000003	0	E
	. . .		
Photoeye Data Bits →	100017	1	E
	100018	1	E
	. . .		
	100032		

Control Bit 1 Clear

Control Bit 1 Clear →	000001	0	D
	000002	0	E
	000003	0	E
	. . .		
	100017	0	E
	100018	0	E
	. .		
Photoeye Data Bits →	100031	1	E
	100032	1	E

8. LEDS in Default Mode

Default is bits 1-0 of **Modicon Output Word 1** set to 0.

LED 1 **Node Fault:** This indicates that a Node is faulted. The fault bank can be accessed to see details of the fault.

LEDs 5–2 **Not used**

LEDs 8–6 **Bank being accessed:** This tells the PLC which bank the scanner is using.

The **value** is	LED 8	LED 7	LED 6
0	OFF	OFF	OFF
1	OFF	OFF	ON
2	OFF	ON	OFF
3	OFF	ON	ON
4	ON	OFF	OFF

LEDs 14–9 **Node number of faulted node:** This is the binary representation of the node number that is faulted. LED 9 is the LSB and LED 14 is the MSB. See the table on the next page (30).

Example: *Node number 15 faulted. 15 dec = 0xf hex. -> 14-OFF 13-OFF 12-ON 11-ON 10-ON 9-ON.*

LED 15 **Power up test failure**

LED 16 **Network power failure**

LEDs 18–17 **Control bits defining how LEDs 1–32 are used:** The default is both "OFF". This setting uses LEDs 1–16 for the first Modicon input word and LEDs 17–32 for the first Modicon output word.

LEDs 23–19 **All "OFF":** These LEDs indicate the Modicon register being mapped to the LEDs. A zero defaults to the first Modicon register.

LEDs 28–24 **All "OFF":** These LEDs indicate the Modicon register being mapped to the LEDs. A zero defaults to the first Modicon register.

LEDs 31–29 These bits indicate the "bank" of registers to access in the RSNetWorx tables.

The **value** is	LED 31	LED 30	LED 29
0	OFF	OFF	OFF
1	OFF	OFF	ON
2	ON	ON	OFF
3	OFF	ON	ON
4	ON	OFF	OFF

LED 32 This indicates if discrete mode is enabled or not. If LED 33 is **ON** bit reversal is enabled.

LEDs 14-9 (Node Number for Faulted Node)

Nodes 0– 31

HEX	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	10	11	12	13	14	15	16	17	18	19	1A	1B	1C	1D	1E	1F
LED 9	○	●	○	●	○	●	○	●	○	●	○	●	○	●	○	●	○	●	○	●	○	●	○	●	○	●	○	●	○	●	○	●
LED 10	○	○	●	●	○	○	●	●	○	○	●	●	○	○	●	●	○	○	●	●	○	○	●	●	○	○	●	●	○	○	●	●
LED 11	○	○	○	○	●	●	●	●	○	○	○	○	●	●	●	●	○	○	○	○	●	●	●	●	○	○	○	○	●	●	●	●
LED 12	○	○	○	○	○	○	○	○	●	●	●	●	●	●	●	●	○	○	○	○	○	○	○	○	●	●	●	●	●	●	●	●
LED 13	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
LED 14	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Node #	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31

Nodes 32– 63

HEX	20	21	22	23	24	25	26	27	28	29	2A	2B	2C	2D	2E	2F	30	31	32	33	34	35	36	37	38	39	3A	3B	3C	3D	3E	3F
LED 9	○	●	○	●	○	●	○	●	○	●	○	●	○	●	○	●	○	●	○	●	○	●	○	●	○	●	○	●	○	●	○	●
LED 10	○	○	●	●	○	○	●	●	○	○	●	●	○	○	●	●	○	○	●	●	○	○	●	●	○	○	●	●	○	○	●	●
LED 11	○	○	○	○	●	●	●	●	○	○	○	○	●	●	●	●	○	○	○	○	●	●	●	●	○	○	○	○	●	●	●	●
LED 12	○	○	○	○	○	○	○	○	●	●	●	●	●	●	●	●	○	○	○	○	○	○	○	○	●	●	●	●	●	●	●	●
LED 13	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
LED 14	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Node #	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63

●	=	**LED ON**
○	=	**LED OFF**

9. Nonvolatile Storage (Flash) UPDATE

If it becomes necessary to update the scanner's exec., refer to the documentation for the **Control Flash Software** provided by Allen-Bradley. The AVG Scanner uses **Flash Memory** (also referred to as nonvolatile storage or NVS). The firmware of the module can be upgraded in the field over the DeviceNet link.

When the AVG Scanner firmware is updated, the files that you need to complete the update will be made available. Check the **AVG web site (www.AVG.net)** for information about firmware updates, or call **AVG Technical Support at 1-800-TEC-ENGR**.

You will need to copy the **"quantscr.NVS"** and **"scanner.hex"** files (from P/N 10F90 software disks) to the same directory as the Control Flash Software.

10. Troubleshooting Table

Message	Description	Recommendation
Input Maps 1-4		
Number of strobe bits exceeds strobe Rx size	The no. bit value exceeds the strobe Rx size value.	The no. bits (number of bits) indicated in the input data-map must be equal to or less than the strobe Rx size. Please note that no. bits indicates bits while the strobe Rx size indicates bytes.
Number of poll bits exceeds poll Rx size	The no. bit value exceeds the poll Rx size value.	The no. bits (number of bits) indicated in the input data-map must be equal to or less than the poll Rx size. Please note that the no. bits indicates bits while the poll Rx size indicates bytes.
Data table bits mapped to module status register	Input bits have been mapped to an area in the input data table that is reserved for the module status word. The first word of an input data table is always reserved for module status.	Re-evaluate where you would like to map your input bits, Enter the correct values for word and bit in the input data-maps's Map Data To.
Data bits mapped beyond end of the input table	Input bits have been mapped outside the boundaries of the input table.	Re-evaluate where you would like to map your input bits. Enter the correct values in for word and bit in the output map's MapTo field.
Input Message Type		
Scan type prohibits poll bit assignment. Scan type prohibits strobe bit assignment. Scan type prohibits strobe and poll bit assignment.	The type of I/O communication indicated does not match the input data map's Map Data From.	Determine what mode of communication you wish to use; strobe, poll, change of state, and/or cyclic. Be sure that I/O values are entered for the appropriate communication mode.
Output Maps 1-4		
Number of strobe bits greater than 1	Each device has one bit of information in the output strobe message; therefore, it is not possible to map more than one bit of output data per device into the strobe message.	Re-enter the correct value for no. bits (number of bits). This must be either one or zero.
Strobe bit assignment inconsistent with device node address	The bit mapping is incorrect for the designated device.	Match the device's node address to the proper position within the strobe message. For example: node address 1 would be mapped to bit 1 of byte 0.
Number of poll bits exceeds poll Tx size	The value entered for bit exceeds the value entered for poll Tx size.	The no. bits (number of bits) indicated in the output data-map must be equal to or less than the poll Tx size. Please note that the no. bits indicates bits, while the poll Tx size indicates bytes.
Data table bits mapped to module command register	Output bits have been mapped from an area in the output data table that is reserved for the module command word. The first word of an output data table is always reserved for module status.	Re-evaluate from where you would like to map your output bits. Enter the correct values for word and bit in the output map's Map Data From.
Data bits mapped beyond end of the output table	Output bits have been mapped from outside the boundaries of the output table	Re-evaluate from where you would like to map your output bits. Enter the correct values for word and bit in the output map's Map From field.
Output Message Type		
Scan type prohibits poll bit assignment Scan type prohibits strobe bit assignment Scan type prohibits strobe, poll, change-of-state, or cyclic bit assignment	The type of I/O communication indicated does not match the output data Map's Map Data To..	Determine what mode of communication you wish to use: strobe, poll, change-of-state, and/or cyclic. Be sure that the correct I/O values are entered for the appropriate communication mode.

Message	Description	Recommendation
Data Mapping		
No output strobe, poll, change-of-state, and cyclic data size specified for current scan type	The scanner has been instructed to strobe, poll, change-of-state, or cyclic a message but has not been allotted any bits to carry out the command.	Type in the appropriate value in the output data map's no. of bits.
Poll Tx size: current scan type prohibits poll bit assignment	A poll bit has been assigned without the communication type set as poll.	Set the mode of communication to poll in Edit Device I/O Parameters screen.
Input source byte: bit offset is greater than 7	The source bit value is greater than seven. Eight bits comprise one byte. When counting the no. bits in a byte, the first bit begins with zero. Any value greater than seven indicates more than eight bits and therefore more than one byte.	Correctly identify the byte and bit offset for the data element desired. Re-enter the corrected values for byte and bit in the input data-map's Map Data From.
Output dest byte: bit offset is greater than 7	The destination bit value is greater than seven. Eight bits comprise one byte. When counting the no. bits in a byte, the first bit begins with zero. Any value greater than seven indicates more than eight bits and therefore more than one byte.	Correctly identify the byte and bit offset for the data element desired. Re-enter the corrected values for byte and bit in the input data-map's Map To field.

For Technical Support call AVG's Application HOTLINE at 1 (800) TEC-ENGR (832-3647)

11. How to Order

SAC-QDNET-010 .... TSX Quantum DeviceNet Scanner Module

Contact your local Modicon Quantum Distributor or AVG Automation to place your order

Factory Customer Service/Order Entry:
4140 Utica Ridge Rd.
Bettendorf, IA 52722
Tel: (563) 359-7501
(800) 711-5109
FAX: (563) 359-9094

WARRANTY

AVG Automation warrant their products to be free from defects in materials or workmanship for a period of one year from the date of shipment, provided the products have been installed and used under proper conditions. The defective products must be returned to the factory freight prepaid and must be accompanied by a Return Material Authorization (RMA) number. The Company's liability under this limited warranty shall extend only to the repair or replacement of a defective product, at The Company's option. The Company disclaims all liability for any affirmation, promise or representation with respect to the products.

The customer agrees to hold AVG Automation harmless from, defend, and indemnify AVG Automation against damages, claims, and expenses arising out of subsequent sales of AVG Automation's products or products containing components manufactured by AVG Automation and based upon personal injuries, deaths, property damage, lost profits, and other matters which Buyer, its employees, or subcontractors are or may be to any extent liable, including without limitation penalties imposed by the Consumer Product Safety Act (P.L. 92-573) and liability imposed upon any person pursuant to the Magnuson-Moss Warranty Act (P.L. 93-637), as now in effect or as amended hereafter.

No warranties expressed or implied are created with respect to The Company's products except those expressly contained herein. The customer acknowledges the disclaimers and limitations contained and relies on no other warranties or affirmations.

CAUTION

AVG Automation's products are carefully engineered and rigorously tested to provide many years of reliable operation. However, any solid-state device may fail or malfunction sometime. The user must ensure that his system design has built-in redundancies if AVG Automation's product is being used in applications where a failure or malfunction of the unit may directly threaten life or cause human injury. The system should be so designed that a single failure or malfunction does not create an unsafe condition. Regularly scheduled inspections, at least once a week, should be made to verify that the redundant circuits are fully functional. All faults should be immediately corrected by repair or replacement of the faulty unit. In addition, the user may have to comply with OSHA, ANSI, state or local standards of safety. The user of AVG Automation's products assumes all risks of such use and indemnifies AVG Automation against any damages.

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